SECTION 16716

PEDESTRIAN SIGNAL & PUSH BUTTON ASSEMBLY

PART 1 GENERAL

1.01 SECTION INCLUDES

This specification sets forth minimum acceptable physical, electrical, and visual characteristics for a light emitting diode (LED)/Incandescent pedestrian traffic control signal indication and push button assemblies. All items furnished under this contract shall be new unused materials of the latest product in production to the commercial trade, and shall be of the highest quality as to materials and workmanship.

1.02 UNIT IDENTIFICATION

Units shall be clearly marked on the back surface of the unit in a permanent manner showing information required for warranty and long term performance. Information to be shown shall include manufacturer name, date of manufacture, electric power requirements, signal model type, and signal serial number.

1.03 SILENCE OF SPECIFICATIONS

The apparent silence of these specifications as to any detail, or the apparent omission from it of a detailed description concerning any point, shall be regarded as meaning that only the best commercial practice is to prevail and that only material and workmanship of the finest quality are to be used. All interpretations of these specifications shall be made on the basis of this statement.

1.04 TEST EQUIPMENT

Supplier(s)/manufacturer(s) shall furnish with their bid a complete description and cost of any special test equipment that is necessary to install, operate, or maintain its equipment.

1.05 TRAINING

Supplier(s)/manufacturer(s) shall conduct technical training seminars for personnel as needed. These seminars shall provide informational and instructional guidance to the maintenance, operation, installation, and repair of equipment furnished under this bid.

1.06 UNIT PRICES

A. Measurement
This item will be measured as by each pedestrian signal and/or pushbutton assembly complete in place.

B. Payment
The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid at the unit price bid for "Pedestrian Signal/ Pushbutton Assembly". This price shall be full compensation for furnishing, assembling, and installing the signal sections for all mounting attachments; and for all labor, tools, equipment and incidentals necessary to complete the work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Manufacturer(s)/supplier(s) furnishing these items shall be experienced in design and construction of such items and shall furnish evidence of having supplied similar items, which have been in successful operation for not less than three years. The bidder shall be an established supplier of the item bid.

B. The lamp units shall be a single, self-contained device, not requiring on-site assembly for installation into an existing traffic signal housing. If proper orientation of the lamp units are required for optimum performance, prominent and permanent directional markings, i.e., UP ARROW or the word UP or TOP, for correct indexing shall be clearly marked on each unit as to configuration and mounting orientation.

2.02 GRID TYPE PEDESTRIAN SIGNAL – INCANDESCENT

It is the intent of this section of the specification to describe minimum acceptable design and operating requirements for an incandescent illuminated grid type pedestrian signal.

A. General Design Requirements

1. Design, material and construction of pedestrian signal heads shall be in accordance with requirements set forth in "Adjustable Face Pedestrian Head Standard", of the Institute of Transportation Engineers and the "Texas Manual on Uniform Traffic Control Devices", latest revision.

2. The general construction shall include a single-piece, double parabolic reflector, and a two-symbol/two-color glass message lens, a single-piece cast aluminum swing down door frame, a blank out Z-crate type sun visor, and appropriate sockets and other hardware. The design shall optimize performance per unit of energy consumed and shall accommodate 60 to 100 watt lamps.
3. Optically, the subject pedestrian signal shall be capable of displaying brightly and uniformly, while being subject to strong ambient light conditions, the alternate symbol messages "HAND" in Portland orange and "WALKING PERSON" in lunar white. Under the same strong ambient light conditions, the messages shall blank out when signal is not energized.

4. The maximum overall dimensions of the signal shall be 19 inches wide, 18-3/4 inches high, and 9-1/2 inches deep including the Z-crate type sun visor and hinges.

B. Mechanical Construction

1. The housing shall be one-piece, corrosion-resistant, die-cast aluminum alloy complete with two-piece "Type III" clamshell hinged mounting bracket or approved equal, designed for left or right hand mounting. Left hand mounting is interpreted as an installation with the supporting pole to the left of the signal legend. A 12-position terminal block shall be mounted within the clamshell assembly. See Drawing 02893-09 and Drawing 02893-10.

2. Signal case shall be designed in such a way that all components and wiring are readily accessible by means of a hinged door and legend cover plate of the full size of housing face.

3. Gasketing material suitable to maintain weather, dust-tight seal about door and cover plates shall be used.

4. The door frame shall be a one-piece, corrosion-resistant aluminum alloy die casting, complete with two-hinged lugs at the bottom and two-latch slots cast at the top of each door. Hinged pins shall be corrosion-resistant material. Two stainless steel wing nuts and washers shall be attached to the top of the cast with the use of stainless steel spring pins. Hence, latching or unlatching of the door shall require no tools.

C. Z-Crate Visor

1. The face of the signal shall be furnished with suitable Z-crate visor baffle designed to prevent false indications, due to sunlight or other reflections, without the use of hoods.

2. The visor baffle shall have a high-grade, flat black finish.

D. Signal Face

1. The message configuration shall be the upraised "HAND" symbol internally illuminated with a Portland orange color source on the left half of the MBS (Message Bearing Surface) and a "WALKING PERSON" symbol internally illuminated with a lunar white color source on the right half of the MBS. The "HAND" and "WALKING PERSON" symbols shall each be a minimum of 12 inches in height. The width of the "HAND" symbol shall be no less than 7 inches wide. The width of the "WALKING PERSON" message shall be a minimum of 6 inches wide. The message configuration, color, and size shall be Class 3 as defined by the Institute of Transportation Engineers Equipment Standard "Pedestrian Traffic Control Signal Indicators" dated March 1985 or- latest version. Internal illumination shall be provided by an incandescent lamp and a colored glass lens.

   (a) Portland Orange - Luminous transmittance shall be not less than 0.300, y-value not greater than 0.390 nor less than 0.331 nor less than 0.977 -x.

   (b) Lunar White - Luminous transmittance shall be not less than 0.290, x-value not greater than 0.420 nor less than 0.329. Value of y shall not be greater than 0.510 -x + 0.186 nor less than 0.510 -x + 0.170.

E. Optical System-Incandescent Pedestrian Signals

1. The optical system shall be designed so as to minimize the return of the outside rays entering the unit from above horizontal (known as sun phantom).

   The optical system shall consist of the following:

   a. Two-symbol, two-color glass message lens.

   b. Double parabolic reflector.

   c. Lamps and lamp sockets.

   d. Z-crate type sun visor.

   The inside face of each message section shall be silk screened with a transparent coating of an appropriate color in the symbol areas to produce a portland orange "HAND" symbol and a lunar white "WALKING

PERSON" symbol when illuminated by a clear traffic signal lamp operating at rated voltage. The entire background shall be fired ceramic mask, black in color.

F. Double Parabolic Reflector

The reflector shall be a single-piece textured aluminized molding with separate reflecting surfaces. The texture shall be on the bulb side of the reflector and shall conform to C-64 or C-66 pattern or equivalent for light uniformity.

The lamp side of the reflector shall be reflectorized by vacuum deposition of an aluminum coating, which shall in turn be protected by a hard wear resistant coating. A full depth aluminum divider that properly mates with the message lens to effectively prevent light spillage from one section to the other shall divide the two sections of the reflector.

G. Wiring

1. All wiring shall be Underwriters' Laboratories (UL) approved for voltages involved. Terminals for field wiring shall be suitable for #14 AWG wire.

2. Barrier type terminal block, minimum twelve (12) terminal plates with (2) two binding screws each, shall be mounted in each housing to connect signal wiring to signal side of terminal block in upper third of clamshell housing. A rain shield shall be provided in upper third of clamshell housing to shield terminal block from water. Clamshell mounting hardware shall be mechanically assembled and wired to pedestrian signal on side specified in plans.

H. Painting

Pedestrian signal housing and clamshell bracket shall be available in two finishes, as indicated on the plans. If no color is indicated on the plans, an aluminum coating, as specified below, shall be furnished.

1. Aluminum Finish: Signal housing and clamshell bracket shall be primed and electrostatically finished with aluminum coating, except for baffle with paint finish. Finish shall be cured for minimum of twenty (20) minutes at 350 degrees F.

2. Flat Black Finish: Signal housing and clamshell bracket shall be primed and finished with a flat black paint finish. Finish shall be cured for a minimum of twenty (20) minutes at 350 degrees F.

2.03 PEDESTRIAN SIGNAL LAMPS

Unless otherwise shown on the Plans, the pedestrian signal lamp shall meet the following requirements. Lamps shall meet the latest approved standard by the Institute of Transportation Engineers (ITE), where differences occur the following shall govern. All lamps shall be warranted for a minimum life of two years.

Item	Pedestrian Indication Lamp
Light center length	2- 7/16 inches
Minimum initial lumens	550
Minimum Rated Life	16,000 hours
Maximum wattage	70
Filament	Tungsten
Inert Gas, %, min	Krypton, 85%
Minimum number of filament supports	7

The glass envelope of each lamp shall be indelibly marked to show the manufacturer's identification, the rated voltage, the rated lumens, the rated average life and orientation of the lamp for proper burning position.

2.04 GRID TYPE PEDESTRIAN SIGNAL – LED

It is the intent of this specification to describe minimum acceptable design and operating requirements for an LED illuminated grid type pedestrian signal.

A. General Design Requirements

1. Design, material and construction of LED pedestrian signal heads shall be in accordance with requirements set forth in "Adjustable Face Pedestrian Head Standard", of the Institute of Transportation Engineers and the "Texas Manual on Uniform Traffic Control Devices", latest revision.

2. The general construction shall include a single-piece cast aluminum housing, a solid state LED indication, message lens, a single-piece cast aluminum swing down door frame, a blank out Z-crate type sun visor, and appropriate other hardware. The design shall optimize performance per unit of energy consumed.

3. Optically, the subject pedestrian signal shall be capable of displaying brightly and uniformly, while being subject to strong ambient light conditions, the alternate symbol messages "HAND" in Portland orange and "WALKING PERSON" in lunar white. Under the same strong ambient

light conditions, the messages shall blank out when signal is not energized.

4. The maximum overall dimensions of the signal shall be 19 inches wide, 18-3/4 inches high, and 9-1/2 inches deep including the Z-crate type sun visor and hinges.

B. Mechanical Construction

1. The housing shall be one-piece, corrosion-resistant, die-cast aluminum alloy complete with two-piece "Type III" clamshell hinged mounting bracket or approved equal, designed for left or right hand mounting. Left hand mounting is interpreted as an installation with the supporting pole to the left of the signal legend. A 12-position terminal block shall be mounted within the clamshell assembly. See Drawing02893-09 and Drawing 02893-10.

2. Signal case shall be designed in such a way that all components and wiring are readily accessible by means of a hinged door and legend cover plate of the full size of housing face.

3. Gasketing material suitable to maintain weather, dust-tight seal about door and cover plates shall be used.

4. The door frame shall be a one-piece, corrosion-resistant aluminum alloy die casting, complete with two-hinged lugs at the bottom and two-latch slots cast at the top of each door. Hinged pins shall be corrosion-resistant material. Two stainless steel wing nuts and washers shall be attached to the top of the cast with the use of stainless steel spring pins. Hence, latching or unlatching of the door shall require no tools.

C. Z-Crate Visor

1. The face of the signal shall be furnished with suitable Z-crate visor baffle designed to prevent false indications, due to sunlight or other reflections, without the use of hoods.

2. The visor baffle shall have a high-grade, flat black finish.

D. Signal Face

1. The message configuration shall be the upraised "HAND" symbol internally illuminated with a Portland orange color source on the left half of the MBS (Message Bearing Surface) and a "WALKING PERSON" symbol internally illuminated with a lunar white color source on the right half of the MBS. The "HAND" and "WALKING PERSON" symbols shall each be a

minimum of 12 inches in height. The width of the "HAND" symbol shall be no less than 7 inches wide. The width of the "WALKING PERSON" message shall be a minimum of 6 inches wide. The message configuration, color, and size shall be Class 3 as defined by the Institute of Transportation Engineers Equipment Standard "Pedestrian Traffic Control Signal Indicators" dated March 1985 or- latest version.

(a) Portland Orange - Luminous transmittance shall be not less than 0.300, y-value not greater than 0.390 nor less than 0.331 nor less than 0.977 -x.

(b) Lunar White - Luminous transmittance shall be not less than 0.290, x-value not greater than 0.420 nor less than 0.329. Value of y shall not be greater than 0.510 -x + 0.186 nor less than 0.510 -x + 0.170.

E. Optical System-LED Pedestrian Signals

The LEDs shall be manufactured using AlInGap (Aluminum-Indium-Gallium-Phosphorous) technology or other LEDs with low susceptibility to temperature degradation. A1GaAs (Aluminum-Gallium-Arsenic) LEDs will not be allowed.

F. Wiring

1. All wiring shall be Underwriters' Laboratories (UL) approved for voltages involved. Terminals for field wiring shall be suitable for #14 AWG wire.

2. Barrier type terminal block, minimum twelve (12) terminal plates with (2) two binding screws each, shall be mounted in each housing to connect signal wiring to signal side of terminal block in upper third of clamshell housing. A rain shield shall be provided in upper third of clamshell housing to shield terminal block from water. Clamshell mounting hardware shall be mechanically assembled and wired to pedestrian signal on side specified in plans.

G. Painting

Pedestrian signal housing and clamshell bracket shall be available in two finishes, as indicated on the plans. If no color is indicated on the plans, an aluminum coating, as specified below, shall be furnished.

1. Aluminum Finish: Signal housing and clamshell bracket shall be primed and electrostatically finished with aluminum coating, except for baffle with paint finish. Finish shall be cured for minimum of twenty (20) minutes at 350 degrees F.

2. Flat Black Finish: Signal housing and clamshell bracket shall be primed and finished with a flat black paint finish. Finish shall be cured for a minimum of twenty (20) minutes at 350 degrees F.

2.05 SPECIFICATIONS FOR PEDESTRIAN MODIFICATION KIT

A. Equipment

1. The visor shall be of the same design as outlined in the GENERAL DESIGN REQUIREMENTS in this specification.

2. The lens shall be a tempered glass with one side textured for even light distribution. The messages shall be the "HAND" symbol in portland orange and a "WALKING MAN" in the lunar white color.

3. The reflector shall be a polycarbonate double parabolic type. The reflector shall have a highly reflective coating applied during construction along with a clear hard coating applied to resist wear and scratching. The two parabolic cavities will be separated by an aluminum divider and silicone gasket. The divider will mate with the lens to prevent false illumination.

4. The lamp socket assembly will consist of (2) two porcelain lamp sockets, an aluminum heat dissipating mounting plate, and a three-position barrier type terminal block. All white wires will connect together as the common.

2.06 SPECIFICATIONS FOR CAST ALUMINUM PUSH BUTTON STATION

A. Material

1. The unit shall be cast from aluminum alloy 319 or equivalent.

2. The unit shall be fabricated free of voids, pits, dents, molding sand and excessive foundry grinding marks. All design radii shall be smooth and intact. Exterior surface finish shall be smooth and cosmetically acceptable by being free of molding fins, cracks and other exterior blemishes.

3. The unit shall be fabricated from new aluminum ingot. No scrap materials shall be used. Minimum requirements are as follows:

Aluminum Alloy 319	Elongation (% in 2") 1.5
Tensile Strength, KSI 28	Brinell Hardness 70-100
Yield Strength, KSI 14	

4. Mounting bolts shall be brass or stainless steel.

B. Design

1. The push button shall be fabricated with dimensions and design characteristics as shown in Drawing No. 1, which are part of this specification.

2. The button of the push button housing shall be tapped for and provided with a 1/2" NPT threaded conduit plug.

3. The back of the push button housing shall be provided with a hole capable of being threaded for a 1/2" NPT conduit plug. The hole shall be capped with a 1/2" plug.

4. The back channel portion of the station shall be designed to accommodate pole diameters from 4" to 14".

5. The upper and lower portions of the channel shall have 3/8" counter-sunk holes when bolting to the pole and shall have raised edges for containing the band when banding to the pole.

6. The push button housing shall be tapped in all four corners for a #8-32 screw to accommodate the push button cover assembly and push button guard.

7. The face of the assembly shall have a cast border; legend and arrow raised 1/8" above the flat surface of the sign.

C. Finish

1. The entire assembly shall have an alodine 1200 conversion coating to prevent oxidation and provide a paint base.

2. The legend, border and arrow shall be painted semi-gloss black, then individually packaged in plastic to prevent damage.

2.07 PUSH BUTTON ASSEMBLY

A. The push button cover assembly shall have a vandal resistant ring around the plunger section of the pushbutton. The push button shall be a heavy-duty mushroom plunger type with a minimum of 2.25 inches in diameter and be weatherproof.

B. The push button and sign assembly shall be (1) one unit as shown in Drawing Nos. 1, 2 or 3. These drawings are part of the specifications.

PART 3 EXECUTION

3.01 MOUNTING REQUIREMENTS

A. Pushbutton assemblies shall be mounted so that the center of the pushbutton is located 42 inches above the sidewalk, or ground surface when sidewalks are not present.

B. All Pedestrian Pushbutton assemblies shall be mounted to the appropriate pole by drilling and tapping. Stainless steel (1/4"(20) X 1-1/2") bolts shall be used to mount the pushbutton assemblies to the poles. Self-tapping screws shall not be used. Stainless steel strapping shall not be allowed.

C. All Pedestrian Signals shall be mounted to each pole by drilling and tapping. Stainless steel (1/2" X 1-1/2") bolts shall be used to mount the pedestrian signals to the poles. Self-tapping screws shall not be used. Stainless steel strapping shall not be allowed without prior approval from the engineer.

3.02 WARRANTIES & GUARANTEES

Minimum warranty (guarantee) shall be for (24) twenty-four months for both materials and workmanship on all items bid under these specifications. The warranty period shall begin the day the City officially installs the items for traffic control purposes or when the City accepts contractor-installed work. Any warranty work shall be completed within (15) fifteen days after receipt of notice of materials deficiencies. NOTIFICATION SHALL BE IN WRITING. Should consumable items, which have a limited shelf life be involved in equipment failure, the supplier shall replace these items if failure of the item is within the specified shelf life, later failure of consumable items will be replaced by the City. Additional provisions are as follows:

A. All material, workmanship and labor furnished shall be covered by supplier/manufacturer guarantee and/or warranty for a minimum period of (24) twenty-four months, or the supplier/manufacturer standard warranty, for whichever period is greater commencing on date of equipment installation in the field.

B. The successful bidder shall bear all expenses connected with the return of any material, which the City deems necessary to return for adjustment during guarantee period.

C. The City of Houston reserves the right to withhold payments which may be due should it be discovered that the items delivered do not meet the specifications and/or claims of bidder.

D. The supplier/manufacturer shall have representatives available on request to assure satisfactory initial operation, and to consult with a Traffic and Transportation representative on any special circuitry that may be required in certain applications.

END OF SECTION